

What is claimed is.

1       1. A method of transmitting data over a communica-  
2       tions network, comprising the steps of:

3           receiving content from a content provider;

4           responsive to said content establishing a first group  
5       directory in a cache;

6           transmitting said first group directory from said  
7       cache on a data channel to a subsidiary cache;

8           establishing a second group directory in said sub-  
9       sidiary cache, said second group directory being derived  
10      from said first group directory; and

11       transmitting said second group directory from said  
12      subsidiary cache to a multicast group of receivers.

1       2. The method according to claim 1, wherein said step  
2       of transmitting said first group directory is performed  
3       using a REMADE protocol.

1       3. The method according to claim 1, wherein said step  
2       of transmitting said first group directory is performed  
3       by periodic transmission thereof.

1       4. The method according to claim 1, wherein said step  
2       of transmitting said first group directory is performed  
3       in response to a request from a receiver thereof.

1       5. The method according to claim 1, wherein said step  
2       of transmitting said first group directory is performed  
3       according to a policy of said content provider.

1       6. The method according to claim 1, wherein said step  
2       of transmitting said second group directory is performed  
3       by periodic transmission thereof.

1       7. The method according to claim 1, wherein said step  
2       of transmitting said second group directory is performed  
3       in response to a request from a receiver.

1       8. The method according to claim 1, wherein said step  
2       of transmitting said second group directory is performed  
3       using a REMADE protocol.

1       9. The method according to claim 1, wherein said step  
2       of transmitting said second group directory is performed  
3       according to a policy of said content provider.

1       10. The method according to claim 1, wherein said  
2       content provider comprises a plurality of content provid-  
3       ers.

1       11. The method according to claim 1, wherein said  
2       subsidiary cache comprises a plurality of subsidiary  
3       caches.

1       12. The method according to claim 11, wherein said  
2 cache and said subsidiary caches are linked together as a  
3 hierarchical tree, said cache forming a root of said hi-  
4 erarchical tree.

1       13. The method according to claim 11, further com-  
2 prising the steps of:

3           receiving a transmission request from a member of  
4 said group of receivers, wherein said transmission re-  
5 quest is responsive to said second group directory; and  
6           responsive to said transmission request, transmitting  
7 a data item from said subsidiary cache to said receiver.

1       14. The method according to claim 1, wherein said  
2 first group directory comprises a root directory hierar-  
3 chically linked to a plurality of subdirectories, said  
4 subdirectories carrying a list of data items, a subtree  
5 of said first group directory being defined by one of  
6 said subdirectories and at least one linked subdirectory  
7 thereunder.

1       15. The method according to claim 1, wherein said  
2 second group directory comprises a root directory hierar-  
3 chically linked to a plurality of subdirectories, said  
4 subdirectories carrying a list of data items, a subtree  
5 of said second group directory being defined by one of  
6 said subdirectories and at least one linked subdirectory  
7 thereunder.

1       16. A computer software product, comprising a com-  
2 puter-readable medium in which computer program instruc-  
3 tions are stored, which instructions, when read by at  
4 least one computer, causes said at least one computer to  
5 execute a method of transmitting data over a communica-  
6 tions network, comprising the steps of:

7              in a first server receiving content from a content  
8 provider;

9              responsive to said content establishing a first group  
10 directory in a cache of said first server;

11              transmitting said first group directory from said  
12 cache on a data channel to a second server having a sub-  
13 sidiary cache;

14              establishing a second group directory in said sub-  
15 sidiary cache, said second group directory being derived  
16 from said first group directory; and

17              transmitting said second group directory from said  
18 subsidiary cache to a multicast group of receivers.

1       17. The computer software product according to claim  
2 16, wherein said step of transmitting said first group  
3 directory is performed using a REMADE protocol.

1       18. The computer software product according to claim  
2 16, wherein said step of transmitting said first group  
3 directory is performed by periodic transmission thereof.

1       19. The computer software product according to claim  
2 16, wherein said step of transmitting said first group

3 directory is performed in response to a request from a  
4 receiver.

1       20. The computer software product according to claim  
2 16, wherein said step of transmitting said first group  
3 directory is performed according to a policy of said con-  
4 tent provider.

1       21. The computer software product according to claim  
2 16, wherein said step of transmitting said second group  
3 directory is performed by periodic transmission thereof.

1       22. The computer software product according to claim  
2 16, wherein said step of transmitting said second group  
3 directory is performed in response to a request from a  
4 receiver.

1       23. The computer software product according to claim  
2 16, wherein said step of transmitting said second group  
3 directory is performed using a REMADE protocol.

1       24. The computer software product according to claim  
2 16, wherein said step of transmitting said second group  
3 directory is performed according to a policy of said con-  
4 tent provider.

1       25. The computer software product according to claim  
2 16, wherein said content provider comprises a plurality  
3 of content providers.

1       26. The computer software product according to claim  
2 16, wherein said subsidiary cache comprises a plurality  
3 of subsidiary caches.

1       27. The computer software product according to claim  
2 26, wherein the method further comprises the steps of:  
3           receiving a transmission request from a member of  
4 said group of receivers, wherein said transmission re-  
5 quest is responsive to said second group directory; and  
6           responsive to said transmission request, transmitting  
7 a data item from said subsidiary cache to said receiver.

1       28. The computer software product according to claim  
2 26, wherein said cache and said subsidiary caches are  
3 linked together as a hierarchical tree, said cache form-  
4 ing a root of said hierarchical tree.

1       29. The computer software product according to claim  
2 16, wherein said first group directory comprises a root  
3 directory hierarchically linked to a plurality of subdi-  
4 rectories, said subdirectories carrying a list of data  
5 items, a subtree of said first group directory being de-  
6 fined by one of said subdirectories and at least one  
7 linked subdirectory thereunder.

1       30. The computer software product according to claim  
2 16, wherein said second group directory comprises a root  
3 directory hierarchically linked to a plurality of subdi-

4     rectories, said subdirectories carrying a list of data  
5     items, a subtree of said second group directory being de-  
6     fined by one of said subdirectories and at least one  
7     linked subdirectory thereunder.

1           31. A system for transmitting data over a communica-  
2      tions network, comprising:

3            a first server, having a cache therein, receiving  
4      content from a content provider, wherein responsive to  
5      said content a first group directory is established in  
6      said cache by said first server,

7            a second server, having a subsidiary cache therein,  
8      said first group directory being transmitted by said  
9      first server from said cache on a data channel to said  
10     subsidiary cache, wherein responsive to said first group  
11     directory, a second group directory is established in  
12     said subsidiary cache by said second server, said second  
13     group directory being derived from said first group di-  
14     rectory, and said second group directory is transmitted  
15     by said second server from said subsidiary cache to a  
16     multicast group of receivers.

1           32. The system according to claim 31, wherein said  
2      first group directory is transmitted using a REMADE pro-  
3      tocol.

1           33. The system according to claim 31, wherein said  
2      first group directory is transmitted periodically.

1       34. The system according to claim 31, wherein said  
2 first group directory is transmitted in response to a re-  
3 quest from a receiver thereof.

1       35. The system according to claim 31, wherein said  
2 first group directory is transmitted according to a pol-  
3 icy of said content provider.

1       36. The system according to claim 31, wherein said  
2 second group directory is transmitted periodically.

1       37. The system according to claim 31, wherein said  
2 second group directory is transmitted in response to a  
3 request from a receiver.

1       38. The system according to claim 31, wherein said  
2 second group directory is transmitted using a REMADE pro-  
3 tocol.

1       39. The system according to claim 31, wherein said  
2 second group directory is transmitted according to a pol-  
3 icy of said content provider.

1       40. The system according to claim 31, wherein said  
2 content provider comprises a plurality of content provid-  
3 ers.

1       41. The system according to claim 31, wherein said  
2 subsidiary cache comprises a plurality of subsidiary  
3 caches.

1       42. The system according to claim 41, wherein said  
2 cache and said subsidiary caches are linked together as a  
3 hierarchical tree, said cache forming a root of said hi-  
4 erarchical tree.

1       43. The system according to claim 41, wherein said  
2 second server receives a transmission request from a mem-  
3 ber of said group of receivers, wherein said transmission  
4 request is responsive to said second group directory; and  
5           responsive to said transmission request, said second  
6 server transmits a data item from said subsidiary cache  
7 to said receiver.

1       44. The system according to claim 31, wherein said  
2 first group directory comprises a root directory hierar-  
3 chically linked to a plurality of subdirectories, said  
4 subdirectories carrying a list of data items, a subtree  
5 of said first group directory being defined by one of  
6 said subdirectories and at least one linked subdirectory  
7 thereunder.

1       45. The system according to claim 31, wherein said  
2 second group directory comprises a root directory hierar-  
3 chically linked to a plurality of subdirectories, said  
4 subdirectories carrying a list of data items, a subtree

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5 of said second group directory being defined by one of  
6 said subdirectories and at least one linked subdirectory  
7 thereunder.